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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/884,084	06/20/2001	Kensaku Komatsu	209991US0	2344

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EXAMINER

FORTUNA, ANA M

ART UNIT	PAPER NUMBER
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1723

16

DATE MAILED: 05/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/884,084

Applicant(s)

Komatsu et al

Examiner

Ana Fortuna

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Mar 26, 2003
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above, claim(s) 10-28 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 29, and 30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____ 6) ☐ Other:

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DETAILED ACTION

Claim Rejections - 35 U.S.C. § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deer Co.*, 383 U.S. 1, 148 USPQ 459

(1966), that are applied for establishing a background for determining obviousness under 35

U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
3. Claims 1-4, 6-8, 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parham et al (5,258,149)(hereinafter '149) or Parham et al ('149) in view of Ruckenstein et al (5,993,661) (hereinafter '661).

Reference '149 discloses the membrane and the process of making the membrane from a combination of hydrophobic and hydrophilic polymer and a pore former or filler, e.g. silica, and by

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wet-spinning(column 6, lines 50-61), the membrane as microporous (include pores between 0.02 to 10 microns) is disclosed in '149, pores of about 0.4 to 0.65 or 0.7 are preferred by in reference '149. is also disclosed (abstract, column 3, lines 3-11, and lines 49-67, and column 5, second paragraph). The particle size and the membrane flow rate is not disclosed in '149. It would have been obvious to one skilled in the art at the time the invention was made to increase the particle size in order to obtain a greater pore size as desired, in '149 the particles are the pore former (column 3, lines 4-8), and do not dissolve in the casting solution (column 5, lines 59-60), therefore, the pore size and pore shape of the membrane is expected to be the size and shape of the particle e.g. silica. One skilled in the art would have selected particles with ellipse or circular shape and with a diameter within the range of pore size or particle size claimed in claims 1, 6, in order to reach to the flow and cut off or the present invention. As to claim 3, the polysulfone materials are disclosed as discussed above. Regarding claims 4, and 7, the percentage of hydrophilic polymer added to the casting solution as being up to 20 (column 5, lines 14-24, and lines 47-56). Regarding claim 6, the step of extracting the microparticles, e.g. by extracting with a base (sodium hydroxide) is also disclosed in '149 (column 7, lines 55-68, column 7, lines 1-5). Reference '661 is cited as cumulative to support the conclusion that the pore size in depending on particle size, and the membrane permeate flow is depending on pore size, and further depending on the polymer/particle ratio in the membrane solution. Reference '661 teaches the process of making a polymeric membrane containing a hydrophilic agent and containing a porogen (pore former) in the casting solution, the porogen is an inorganic particle e.g. silica, etc., the pore size

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selecting a wide range of silica particles sizes, preferably from 15 to 40 microns, and extracting the particles by coagulating the membrane in an alkaline solution, e.g. NaOH (column 6, lines 5-14), to dissolve silica and form the pores is also disclosed (Abstract, column 3, lines 50-65, column 4, lines 1-29). The effect in membrane flux in silica content or ration in the solution is disclosed in column 4, lines 44-53). The hydrophilic polymers or agents are also disclosed (column 5, second paragraph). The effect of particles size in the membrane pore size and membrane permeation properties, are disclosed in example 5 (column 7, lines 40-68); the example compares results of membranes having large pore size or made from a large size particles, e.g. 10 microns, and membranes made from particles having a 5 micron size, and further teaches, "The larger silica particles provided the larger pore size and, hence, the larger flow rates of pure water through the membrane" (column 7, lines 58-60). '661 fails to teach the polymer the details of making the membrane by spinning process, however, teaches making the membrane having hollow fiber shape (column 5, lines 23-30). It would have been obvious to one skilled in the art at the time the invention was made, in a process of making a polymeric porous membrane using inorganic porogen, such as silica, to control the membrane pore size and/or membrane permeability by varying the particle size, making a membrane within the pore size range claimed in the present invention is disclosed in '66, and the process of obtaining larger or smaller pore size is also disclosed, therefore, the rejection over Parham et al ('149), as discussed above is proper and is further supported by the teaching of '661. Regarding claim 3, the membrane made of polysulfone is not disclosed by reference '661, however the effect of particle size in the membrane

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formation is not depending of the polymer, but on the inorganic particle properties, e.g. insolubility, and capability of being dissolved in sodium hydroxide (NaOH). It would have been obvious to one skilled in the art at the time the invention was made to expect the same results, e.g. pore size variation, which results are evidence by the range of pore size range obtained in the membrane of '149.

4. Claims 5, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parham et al (5,258,149)(hereinafter '149), or Parham et al in view of Ruckenstein et al (5,993,661), as applied to claims 1-4, 6-8, 29-30 above, and further in view of Stengard (5,019,261)(hereinafter '261) or . Reference '149, discussed above fails to disclose the hydrophilic polymer as polyvinyl alcohol. As to claims 5 and 9, reference '261 teaches OH containing polymers for modifying polysulfone properties to hydrophilic, and further discloses polyvinyl alcohol (abstract). It would have been obvious to one skilled in the art at the time the invention was made to substitute the polyethylene glycol (hydrophilic compound) suggested in reference '149, by polyvinyl alcohol, e.g. to provide)H containing groups to modify the structure and surface characteristics of the membrane e.g. its porosity and provide hydrophilic properties, as suggested by '261.

5. Withdrawal of claims 10-28 is maintained, reasons are stated in the record (Paper No.8).

6. A full response to Applicant's arguments can be found in attachment to paper No. 12 (advisory action). Which response is further supported by reference '661.

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7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ana Fortuna whose telephone number is (703) 308-3857. The examiner can normally be reached on Monday-Friday from 9:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda Walker, can be reached on (703) 308-0457. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9310 for regular responses, and (703)872-9311 for after finals.

Ana Fortuna

November 15, 2002



ANA FORTUNA
PRIMARY EXAMINER